

# **[ *OVER-VOLTAGE CROWBAR FOR LIGHTNING SURGE AND ESD PROTECTION* ]**

## **Abstract of Disclosure**

FI over-voltage crowbar provides lightning surge and ESD protection. The crowbar has a clamping transistor, which is driven by a mirror-amplifier. When an input surge voltage is higher than the voltage of a Zener diode, the mirror-amplifier will be switched on and generate an amplified voltage. The amplified voltage works together with a speed-up capacitor easily to switch on the clamping transistor. The mirror-amplifier has an n-transistor and two p-transistors, which provide sufficient headroom for the turn-on of a clamping transistor. The over-voltage crowbar of this invention rapidly drives the clamping transistor to low impedance, thereby achieving a higher sustenance rating for lightning surge and ESD in the integrated circuit.

## Figures